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GREENBERG-TRAURIG
1750 TYSONS BOULEVARD, 12TH FLOOR
MCLEAN, VA 22102

EXAMINER

KANG, JULIANA K

ART UNIT	PAPER NUMBER
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2874

DATE MAILED: 07/18/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/884,463

Applicant(s)

INGMAN ET AL.

Examiner

Juliana K. Kang

Art Unit

2874

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-43 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-11, 14-35 and 38-43 is/are rejected.
- 7) ☒ Claim(s) 12, 13, 36 and 37 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5. 6) ☐ Other: .

DETAILED ACTION

Inventorship

1. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

Claim Objections

2. Claims 5, 8 and 37 are objected to because of the following informalities: claim 5 recites the limitation "the overlaid layer" in line 1. There is insufficient antecedent basis for this limitation in the claim. It appears that claim 5 should be amended so that claim 5 is dependent on claim 4 instead of claim 1.

Claim 37 recites the limitations "the inner layer" and "the outer layer" in lines 1 and 2. There are insufficient antecedent bases for these limitations in the claim. It appears that claim 37 should be amended to be dependent on either claim 35 or claim 36.

Claim 8 is further limiting what is recited in claim 7, thus claim 8 should be amended to be dependent on claim 7.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-4, 6-10, 33 and 34 are rejected under 35 U.S.C. 102(b) as being anticipated by Inniss et al (U.S. Patent 5,214,734).

Regarding claims 1 and 33, Inniss et al disclose an optical fiber comprising a core (10) and a cladding layer (20) including a plurality of nano-particles around the core (see column 3 lines 3-12 and 50-56).

Regarding claims 2 and 3, Inniss et al's cladding layer is a mixture of polymer (filler) and particles (see column 3 lines 30-34).

Regarding claims 4 and 34, Inniss et al disclose an overclad layer (30) around the cladding layer (20) (see column 3 lines 9-12).

Regarding claim 6, Inniss et al's core (10) is silica-based fiber (see column 2 line 18).

Regarding claims 7 and 8, Inniss et al disclose using silica nano-particles and other appropriate materials including metallic oxide such as TiO_2 (see column 3 line 67- column 4 line 1 and column 4 lines 25-31).

Regarding claim 9, Inniss et al's nano-particles are made of silica and a silica compound is hydrophilic.

Please note, regarding the rejections above that method claims 33 and 34 parallel article claims 1 and 4 exactly without the introduction of any particular manufacturing methods, so that it is proper to examine the article and method claims together.

5. Claims 1, 4, 5, 7 and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Kengo et al (WO 00/25159).

Regarding claims 1, 7 and 8, Kengo et al disclose an optical fiber comprising a core (1) and a cladding layer (3, light diffusive layer) including a plurality of nano-particles consisting of light scattering material having a particle size of about 10nm to 300um wherein the light scattering material consisting of glass or other materials or titanium dioxide particles around the core (Page 6 lines 3-26 and page 9 line 13).

Regarding claims 4 and 5, Kengo et al disclose an overclad layer (4) that includes Teflon (see page 11 lines 18-24).

6. Claims 22-25 and 43 are rejected under 35 U.S.C. 102(e) as being anticipated by Dawes et al (U.S. Patent 6,519,380 B2).

Regarding claims 22 and 43, Dawes et al disclose an optical transmission structure comprising a substrate, a waveguide on the substrate and a cladding layer including a plurality of nano-particles over the waveguide (see Fig. 5A and column 14 lines 41-48).

Regarding claims 23-25, Dawes et al's cladding layer is made by mixing a polymer material (filler) with silica nano-particles (column 14 lines 43-45).

Please note, regarding the rejections above, that method claim 43 parallels article claim 22 exactly without the introduction of any particular manufacturing methods, so it is proper to examine the article and method claims together.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Inniss et al as applied to claim 1 above, and further in view of Perelman (U.S. Patent 4,368,350).

As described above, Inniss et al disclose the claimed invention. However, Inniss et al do not teach a resin foam in the cladding layer. Perelman teaches using a foamed resin in a coaxial cable to provide structural strength and moisture blocking (see column

Art Unit: 2874

3 lines 41-49). Thus it would have been obvious to one with ordinary skill in the art at the time the invention was made to add a resin foam in Inniss et al's cladding layer to provide additional structural strength and moisture blocking.

9. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Inniss et al as applied to claim 1 above, and further in view of Gleason et al (U.S. Patent 6,349,161 B1).

As described above, Inniss et al disclosed the claim invention except a thixotropic material in the cladding layer. Gleason et al teach having a thixotropic material around optical fibers to block water. Thus it would have been obvious to one with ordinary skill in the art at the time the invention was made to use a thixotropic material in Inniss et al, as taught by Gleason et al, to protect the cable from water damage.

10. Claims 16-20 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inniss et al.

Regarding claims 16 and 26, Inniss et al disclose all the claimed limitations except a plurality of cores. Using a plurality of cores in an optical fiber cable allows simultaneous transmission of the signals at many wavelengths and increases the total transmission capacity. Thus, it would have been obvious to one with ordinary skill in the art to use a plurality of cores in Inniss et al's invention to increase the transmission capacity. Optical fibers are usually coupled to other optical elements. Placing the

optical fibers on a substrate provides a precise and easier alignment between optical fibers and optical elements thus it would have been obvious to one with ordinary skill in the art to include a substrate in Inniss et al for easier and more precise fiber alignment.

Regarding claims 17 and 18, Inniss et al's cladding layer is mixture of polymer (filler) and particles (see column 3 lines 30-34).

Regarding claim 19, Inniss et al disclose an overclad layer (30) around the cladding layer (20) (see column 3 lines 9-12).

Regarding claim 20, Inniss et al's disclose using silica nano-particles and other appropriate materials including metallic oxides (see column 3 line 67-column 4 line 1 and column 4 lines 25-31).

11. Claims 10, 11, 32 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inniss et al as applied to claims 1, 26 and 33 above, and further in view of Girgis et al (U.S. Patent 6,087,000).

Regarding claims 10, 11, 32 and 35, as described above, Inniss et al disclose the claimed invention including two layers comprised of different particles including silica particles (see column 3 lines 3-12). However, Inniss et al do not teach that nano-particles are a mix of hydrophilic and hydrophobic particles. Girgis et al teach an optical fiber cable having a hydrophobic primary layer and a hydrophilic second layer over the primary layer to inhibit water wicking in the optical fiber cable. Thus it would have been obvious to one with ordinary skill in the art at the time the invention was made to use a mixture of hydrophilic and hydrophobic compositions in Inniss et al as taught by Girgis

et al in order to protect the optical fiber cable from water wicking along the cable. Inniss et al/Girgis et al's cable with two hydrophilic and hydrophobic compound layers inherently provides different hydrophobicity characteristics. Please note, regarding the rejections above, that method claim 35 parallels an article claim 11 exactly without the introduction of any particular manufacturing methods, so that it is proper to examine the article and method claims together.

12. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Inniss et al as applied to claim 16 above, and further in view of Girgis et al (U.S. Patent 6,087,000).

As described above, Inniss et al teach the claimed invention except the nano-particles that are a mix of hydrophilic and hydrophobic particles. Girgis et al teach an optical fiber cable having a hydrophobic primary layer and a hydrophilic second layer over the primary layer to inhibit water wicking in the optical fiber cable. Thus it would have been obvious to one with ordinary skill in the art at the time the invention was made to use a mixture of hydrophilic and hydrophobic compositions in Inniss et al as taught by Girgis et al in order to protect the optical fiber cable from water wicking along the cable. Inniss et al/Girgis et al's cable with two hydrophilic and hydrophobic compound layers inherently provides different hydrophobicity characteristics.

13. Claims 26-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dawes et al (U.S. Patent 6,519,380 B2) and further in view of Ooba et al (U.S. Patent 6,122,416).

Regarding claims 26-28 and 30, as described above, Dawes et al disclose the claimed invention except a plurality of waveguide stacked on the substrate. Ooba et al teach stacked waveguides on a substrate enables a compact device construction (see column 3 lines 19-24). Thus it would have been obvious to one with ordinary skill in the art at the time the invention was made to stack waveguides in Dawes et al as taught by Ooba et al in order to make the device smaller.

Regarding claim 29, Dawes et al teach doped silica waveguide core (see column 2 lines 46-47).

Regarding claim 31, Dawes et al's nano-particles are made of silica and a silica compound is hydrophilic.

14. Claim 38 is rejected under 35 U.S.C. 103(a) as being unpatentable over Inniss et al as applied to claim 33 above, and further in view of Horikoshi et al (JP402252632A).

As described above, Inniss et al disclose coating an optical fiber core with nano-particles. However, Inniss et al do not positively teach any specific coating methods. Horikoshi et al teach a method of making optical fiber by immersing the optical fiber preform (which includes coating material) in a water-alcohol medium. Thus it would have been obvious to one with ordinary skill in the art at the time the invention was

Art Unit: 2874

made to use any coating methods including the Horikoshi et al's in Inniss et al to coat the fiber.

15. Claim 39 is rejected under 35 U.S.C. 103(a) as being unpatentable over Inniss et al as applied to claim 33 above, and further in view of Kanda et al (U.S. Patent 4,740,055).

As described above, Inniss et al disclose coating an optical fiber core with nano-particles. However, Inniss et al do not positively teach any specific coating methods. Kanda et al teach coating an optical fiber with polymer particles having particle sizes of 10nm to 6000nm (see column 3 line 1) wherein the particles are prepared using an azeotropic distillation (drying) method (see column 2 lines 42-48). Thus, it would have been obvious to one with ordinary skill in the art at the time the invention was made to use any particle coating method including Kanda et al's azeotropic distillation method in Inniss et al in order to coat the fiber core with nano-particles.

16. Claim 40 is rejected under 35 U.S.C. 103(a) as being unpatentable over Inniss et al as applied to claim 33 above, and further in view of Freidinger et al (DE3919067 A1).

Inniss et al disclose coating an optical fiber core with nano-particles. However, Inniss et al do not positively teach any specific coating methods. Freidinger et al teach coating an optical fiber by drawing a coating material in the form of paste. Thus, it would have been obvious to one with ordinary skill in the art at the time the invention

was made to use any coating methods including a drawing method in Inniss et al as taught by Freidinger et al to coat an optical fiber with a coating material.

17. Claims 41 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inniss et al as applied to claim 33 above, and further in view of Minemoto et al (U.S. Patent 5,699,461).

As described above, Inniss et al disclose coating an optical fiber core with nano-particles. However, Inniss et al do not positively recite any specific coating methods. Minemoto et al teach coating the fiber by applying the optical fiber with a polymer paste (filler) comprising fine particles and then drying (see column 13 lines 46-54). Thus, it would have been obvious to one with ordinary skill in the art to use any coating method including the method of applying and drying in Inniss et al as taught by Minemoto et al to coat the fiber with polymer that includes fine particles.

Allowable Subject Matter

18. Claims 12, 13, 36 and 37 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The feature of claims 12 and 37 wherein the cladding layer includes the inner layer of metallic oxide nano-particles and outer layer of silica nano-particles to accomplish the applicant's invention, is not disclosed or suggested by Inniss et al or by any other prior art of record. Applicant's specific arrangement of hydrophobic nano-particles in the outer cladding protects the core from water and moisture while the hydrophilic

Art Unit: 2874

nano-particles in the inner cladding protects the core by trapping and expelling of water or moisture that has already penetrated into the cladding layer.

The feature of claim 13 wherein the cladding layer includes an inner layer of molybdenum disulfide nano-particles and outer layer of Teflon nano-particles to accomplish the applicant's invention, is not disclosed or suggested by Inniss et al or by any other prior art of record. Applicant's specific arrangement of hydrophobic material of Teflon in the outer cladding protects the core from water and moisture while the hydrophilic nano-particles of molybdenum disulfide in the inner cladding protects the core by trapping and expelling of water or moisture that has already penetrated into the cladding layer and provides good adhesion to the core.

The feature of claim 36 wherein the coating step includes the step of negatively charging the fiber core and positively charging the inner layer and negatively charging the outer layer to accomplish the applicant's invention, in combination with the other claimed features is not disclosed or suggested by Inniss et al or by any other prior art of record.

Conclusion

19. The prior art documents submitted by applicant have been considered and made of record (note the attached copy of form PTO-1449).


20. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Yamanishi et al (U.S. Patent 4,539,219) teach charging coating particles with a charge of a polarity opposite a polarity of the optical fiber. Kuder et al

(U.S. Patent 5,754,725) teach dipping an optical fiber into the water/alcohol-based cladding emulsion. Adachi et al (U.S. Patent 5,073,048) teach adding a molybdenum disulfide powder on optical fiber as a lubricant and a gelation retarding material.

21. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Juliana K. Kang whose telephone number is (703) 305-6259. The examiner can normally be reached on Mondays and Thursdays 7:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rod Bovernick can be reached on (703) 308-4819. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7724 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-3072.


Juliana Kang
July 12, 2003